

Mustahiq (Zakat Recipient) Determination Application with Analytic Hierarchy Process Model

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Abstract. Zakat is a rule in Islam and is included in the third pillar of Islam related to property. Zakat has a purpose, namely to clean our wealth and zakat can cleanse the human heart from greed, miserliness, and worldly nature. Zakat also helps the implementation of social security programs by balancing the status between communities, so that there is no social inequality that is too far in the gap between rich and poor. Zakat processing must be managed as well as possible by the amil zakat agency, which is currently the institution that manages zakat, namely the National Amil Zakat Agency (BAZNAS). Therefore, to achieve this goal, BAZNAS must be able to determine which parties are entitled to receive zakat, so that it is right on target. This study aims to determine the determination of mustahiq by applying the application through the analytic hierarchy process (AHP) model. The results obtained in this study contained five criteria modeled in the analytic hierarchy process (AHP). The main criteria factors that influence the determination of mustahiq are the criteria for workers with a result of 49.5%, then the second factor that affects is the number of dependents of the family who get a result of 24.1%, after that the third factor that influences is income (income) with a result of 16.6%, then the fourth factor is home ownership with a yield of 6.1% and the last factor, namely age, has a result of 3.4%.

Keywords: Zakat, BAZNAS, Analytic Hierarchy Process, AHP, Modelling

INTRODUCTION

Indonesia is currently ranked as the fourth most populous country in the world. The large number of people living in a certain area can have an influence on the welfare of the community. Because it has an impact on minimum employment and the unequal distribution of people's income can cause poverty problems throughout the country. One of them is the State of Indonesia, from data obtained from the BPS for the poor until March 2021 of 27.54 million people. The existence of the problem of poverty that continues to occur, makes the government, national institutions, regions and certain people distribute zakat, infaq, alms and assistance to people in need. One of the national and regional institutions that provide zakat is the National Amil Zakat Agency. (S. Santoso and R. Agustino, 2018)(BAZNAS, n.d.)

Zakat in the perspective of fiqh has rules in issuing zakat to mustahiq or those who are entitled to receive zakat. In At-Taubah Verse 60, *Allah Subbahahu Wata'ala* has provided provisions for eight mustahiq groups so that zakat funds are channeled appropriately and are accepted by people who need these funds. Determination of the terms and criteria in the selection of mustahiq (zakat recipients) is needed, besides that muzakki (zakat givers) need to survey prospective zakat recipients (mustahiq) to prove that the zakat funds that will be channeled are right to those who are entitled to receive them. Moreover, currently BAZNAS as an organization appointed by the government makes various field programs in distributing zakat.

The amount of funds managed by BAZNAS in the last few years certainly requires a model to solve it. Analytic Hierarchy Process (AHP) is one of the models used in creating categories in this problem. AHP is used as a decision support system to obtain terms and criteria in the selection of zakat recipients. (Timor et al., 2020) (Timor et al., 2020)(Hussain et al., 2015)

LITERATURE REVIEW

The decision support system as one of the systems that support management to help complete work that is more analytical and not for automate on decision making but to provide interactive tools that enable decision

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making carry out analytical activities using predefined criteria provided. With this decision support system, it is hoped that facilitate decision making in choosing logical decisions in every problem situation that occurs.(Haerani & Ramdaril, 2018)

This system is intended to be a tool assist decision makers in making decisions that require an assessment or an unstructured decision.

The analytic hierarchy process (AHP) model is a decision-making model that can be used in determining the weight of the criteria based on the priority of another criterion. This model can provide a more practical solution in providing decisions to be taken.(Iswara et al., 2018)

According to Gunawan, 2014 analytic hierarchy process (AHP) is a decision support model that can solve complex multifactor problems in the form of a hierarchy. Where the hierarchy can represent the existing problems become complex by forming a multilevel structure. Where this multilevel structure is occupied by the first level is the goal, then the second level is the factor criteria and sub criteria, and the last level is the alternative that will be needed. So that by turning the problem into a complex hierarchical form, the problem can look systematic and structured. (Gunawan, 2014)

The analytic hierarchy process (AHP) model provides a goal in solving complex and unframed problems where there is very little data and statistical information from the problems encountered, so you can choose the best from a number of alternatives that have been tested and evaluated by taking into account the several criteria presented.(Setiadi et al., n.d.)

A This type of research in terms of the approach used is quantitative research. Quantitative research is an experimental and survey research method whose types of data are in the form of numbers that can be measured and analyzed to obtain research conclusions.

The variables used in this study are criteria that can affect the determination of zakat recipients (mustahiq) in accordance with the zakat utilization program at BAZNAS, namely in accordance with the following criteria:

- 1) Job
- 2) Number of dependents
- 3) Income
- 4) Home Ownership
- 5) Age

METHOD

In this study using the type of applied research method (applied research). According to Sugiono, 2018 that applied research is research carried out with the aim of applying, testing and evaluating the ability of a theory that is applied in solving practical problems.(Sugiyono, 2014)

The type of data used in this research is secondary data. The source of the data obtained in this study is the National Zakat Agency (BAZNAS) as well as a very relevant literature study to support this research. In this study, the flow and research procedures that will be carried out by researchers are as follows:

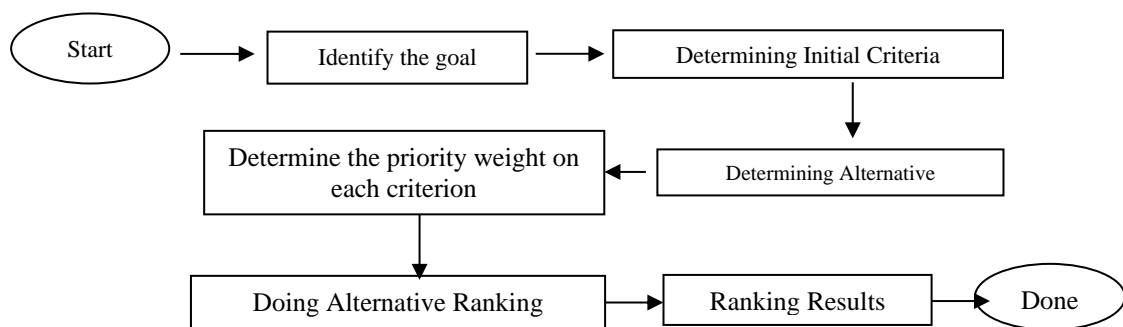


Figure 3.1 Research Flowchart

Based on the results of the research that has been done, the calculation of the determination of zakat recipients (mustahiq) is obtained using the Analytic Hierarchy Process (AHP) model as follows:

- a. Analytical Hierarchical Process Model Design (AHP)
- b. Assumptions Model Analytic Hierarchy Process (AHP)

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3.1. Tabel Model Assumption

Criteria	Symbol
Profession	C1
The number of dependents	C2
Age	C3
Home ownership	C4
Income	C5

c. Calculating Pairwise Comparison Matrix Between Criteria

3.2. Tabel Pairwise Comparison Matrix Between Criteria

Information:	Score
EI : Equally Important	1
SI : More important	3
SI : Strong Important	5
SI: Stronger Important	7
AI : Absolute More Important	9

Calculating Using the Analytical Hierarchical Process Model (AHP)

Table 3.3. Pairwise comparison matrix for each criterion

Criteria	Profession	The number of dependents	Age	Home ownership	Income
Profession	1	4	9	8	3
The number of dependents	1/4	1	7	6	2
Age	1/9	1/7	1	1/3	1/5
Home ownership	1/8	1/6	3	1	1/4
Income	1/3	1/2	5	4	1

RESULT

This study discusses a decision support system with the AHP model that functions to support decision making in determining zakat recipients (mustahiq) as the best or most efficient choice maker. The following are the calculation steps generated using the AHP model:

Table 3.8. Simplified pairwise comparison matrix for each criterion

Criteria	Profession	The number of dependents	Age	Home ownership	Income
Profession	1	4	9	8	3
The number of dependents	0,25	1	7	6	2
Age	0,111	0,143	1	0,333	0,2
Home ownership	0,125	0,167	3	1	0,125
Income	0,333	0,5	5	4	1
Column	1.819	5.81	25	19.333	6.45

Table 3.9. Normalization of pairwise comparison matrix for each criterion

Criteria	Profession	The number of dependents	Age	Home ownership	Income	Line	vektor eigen
Profession	0,549	0,688	0,36	0,414	0,465	2.476	0,4952
The number of dependents	0,137	0,172	0,28	0,310	0,310	1.209	0,2418
Age	0,061	0,024	0,04	0,017	0,031	0,173	0,0346
Home ownership	0,069	0,029	0,12	0,052	0,039	0,309	0,0618
Income	0,183	0,086	0,2	0,207	0,155	0,831	0,1662

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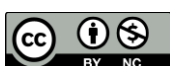


Table 3.10. Alternative pairwise comparison matrix based on job criteria

Profession	Faqir	Gharim	Riqab	Fisabilillah	Mualaf	Miskin	Ibnu Sabil	Amil
Faqir	1	6	4	5	2	3	3	4
Gharim	1/6	1	¼	1/3	1/6	1/5	1/3	½
Riqab	¼	4	1	2	1/4	1/3	1/2	3
Fisabilillah	1/5	3	1/2	1	1/5	¼	5	2
Mualaf	½	6	4	5	1	2	2	3
Miskin	1/3	5	3	4	1/2	1	1/3	2
Ibnu Sabil	2	1/3	3	2	4	1/5	1	½
Amil	1/3	1/5	2	3	4	2	2	1

Table 3.11. Normalization of alternative pairwise comparison matrix based on job criteria

Profession	F	Gharim	Riqab	Fisabilillah	Mualaf	Miskin	Ibnu Sabil	Amil	Line	Vector Eigen
Faqir	0.2090	0.23499	0.225352	0.223884	0.165057	0.333964	0.211775	0,25	1.854096	0,23176
Gharim	0,03491	0,03916 5	0,014085	0,014911	0,013782	0,022264	0,023507	0,03125	0.193879	0,24233
Riqab	0,05226	0,15666	0,056338	0,089554	0,020632	0,03707	0,035296	0.1875	0,635318	0,07941
Fisabilillah	0,04181	0.11749 5	0,028169	0,044777	0,016506	0,02783	0,352958	0,125	0,754549	0,09431
Mualaf	0.10453	0.23499	0.225352	0.223884	0,082529	0.222643	0.141183	0.1875	1.422618	0.17782
Miskin	0,06962	0.19582 5	0.169014	0.179107	0,041264	0.111321	0,023507	0,125	0,914661	0.11433
Ibnu sabil	0,41814	0,01304 2	0.169014	0,089554	0.330115	0,022264	0,070592	0,03125	1.143978	0.14299
Amil	0,06962158	0,00783 3	0.112676	0.13433	0.330115	0.222643	0.141183	0,0625	1.080902	0.13511
Coloumn	1	1	1	1	1	1	1	1	8	1

Table 3.12. Alternative pairwise comparison matrix based on the number of dependents criteria.

The number of dependents	Fakir	Gharim	Riqab	Fisabilillah	Mualaf	Miskin	Ibnu Sabil	Amil
Faqir	1	7	5	6	2	3	1/3	3
Gharim	1/7	1	¼	1/3	1/7	1/6	1/7	5
Riqab	1/5	4	1	2	1/5	1/3	3	½
muallaf	1/6	3	1/2	1	1/6	1/4	4	1/3
Gharim	½	6	4	5	1	2	2	2
Riqab	1/3	5	3	4	½	1	1/3	4
Ibnu Sabil	1/3	3	2	3	5	2	1	2
Fisabilillah	½	3	2	5	2	1/3	2	1

Table 3.13. Normalization of the alternative pairwise comparison matrix based on the criteria for the number of dependents

The number of dependents	Faqir	Gharim	Riqab	Fisabilillah	Mualaf	Miskin	Ibnu Sabil	Amil	Line	Vector Eigen
Faqir	0.3148	0,3572	0.2816	0.1761	0.1816	0,4044	0,0258	0,0249	1.7667	0.3926
Gharim	0,0449	0,0510	0,0140	0,0195	0,0129	0,0224	0,2322	0,3740	0,7714	0.1714
Riqab	0,0629	0,0102	0,0563	0,0293	0,0181	0,0449	0,0193	0,0374	0,2787	0,0619
Fisabilillah	0,0524	0,0072	0,0281	0,0587	0,0151	0,0337	0,3096	0,0249	0,5301	0.1178
Mualaf	0,1574	0,3061	0,2253	0,0117	0,0908	0.2696	0.1548	0.1496	1.3656	0,3034
Miskin	0.1049	0.2551	0.1690	0,2348	0,0454	0.1348	0,0258	0,2992	1.2692	0.2820
Ibnu Sabil	0.1049	0,0072	0.1126	0.1761	0,4541	0,0449	0,0774	0,0149	0,9925	0,2205
Amil	0,1574	0,0056	0.1126	0,2935	0.1816	0,0449	0.1548	0,0748	1.025	0,2279
Coloumn	1	1	1	1	1	1	1	1	8	1

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Table 3.14 Alternative pairwise comparison matrix based on age criteria

Age	Faqir	Gharim	Raqib	Fisabilillah	Mualaf	Miskin	Ibnu Sabil	Amil
Faqir	1	7	4	5	6	9	7	3
Gharim	1/7	1	5	1/5	5	2	7	3
Riqab	¼	4	1	1/5	3	6	1/2	1/5
Fisabilillah	1/5	5	5	1	7	8	1/3	1/5
Mualaf	1/6	3	1/3	1/7	1	3	2	3
Miskin	1/9	½	1/6	2	2	1	1/3	¼
Ibnu Sabil	2	3	1/3	2	1/3	2	1	1/3
Amil	1/7	1/7	3	5	2	4	2	1

Table 3.17. Normalization of alternative pairwise comparison matrix based on house ownership criteria

Home ownership	Faqir	Gharim	Riqab	Fisabilillah	Mualaf	Miskin	Ibnu Sabil	Amil	Line	Vector Eigen
Faqir	0,379	0,300	0,195	0.3828	0,339	0,253	0,147	0.136	2.134	0.2668
Gharim	0,0474	0,037	0,455	0.2734	0,016	0,012	0,3442	0.136	1.324	0,165
Riqab	0.1265	0.2252	0,0650	0,0273	0.1697	0,202	0,0983	0,0227	0.9375	0.117
Fisabilillah	0,0542	0,0750	0,0130	0,0546	0,0212	0,025	0,0163	0.3409	0,600	0,075
Mualaf	0,0948	0.1876	0,032	0.2187	0,0848	0.1518	0,098	0.1363	1,005	0,125
Miskin	0,0759	0.1501	0,0216	0,0136	0,0282	0,0503	0.1475	0,0227	0,510	0,063
Ibnu Sabil	0,0948	0,0053	0,0216	0,0182	0.1697	0,151	0,0491	0.1363	0,647	0,080
Amil	0.1265	0,0187	0.1952	0,0109	0.1697	0,151	0,0983	0,0681	0,839	0.104
Coloumn	1	1	1	1	1	1	1	1	8	1

Table 3.18. Alternative pairwise comparison matrix based on income criteria

Income	Faqir	Gharim	Riqab	Fisabilillah	Mualaf	Miskin	Ibnu Sabil	Amil
Faqir	1	3	4	2	1/3	1/6	7	9
Gharim	1/5	1	7	1/5	1/6	5	9	3
Riqab	2	1/7	1	4	½	1/3	2	4
Fisabilillah	1/2	2	7	1	1/5	1/7	3	5
Mualaf	4	1/5	2	1/5	1	1/2	2	4
Miskin	2	1/5	3	1/5	2	1	2	3
Ibnu Sabil	1/5	1/3	2	1/5	1/3	2	1	3
Amil	1/3	1/7	2	1/3	½	3	½	1

Table 3.19. Normalization of alternative pairwise comparison matrix based on Income criteria

Income	Faqir	Gharim	Riqab	Fisabilillah	Mualaf	Miskin	Ibnu Sabil	Amil	Line	Vector Eigen
Faqir	0,097	0,427	0,142	0.245	0,066	0,013	0.264151	0.28125	1.539	0.3420
Gharim	0,019	0.1424	0,25	0,0245	0,0331	0,4117	0.339623	0,0937	1.314	0.2920
Riqab	0,195	0,0203	0,035	0,4918	0,09933	0,0274	0,075472	0,125	1.070	0,2379

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Fisabilillah	0,048	0.2849	0,25	0.1229	0,03973	0,0117	0.113208	0,1562	1.027	0,2283
Mualaf	0.3908	0,0284	0,071	0,02459	0.19867	0,0411	0,075472	0,125	0,955	0.2123
Miskin	0.1954	0,0284	0.107	0,0245	0.39735	0,0823	0,075472	0,0937	1,0045	0,2232
Ibnu Sabil	0,019	0,0474	0,071	0,0245	0,06622	0.1647	0,037736	0,0937	0,525	0.1167
Amil	0,032	0,0203	0,071	0,0409	0,09933	0.2470	0,018868	0,0312	0,5618	0.1248
Coloumn	1	1	1	1	1	1	1	1	8	1

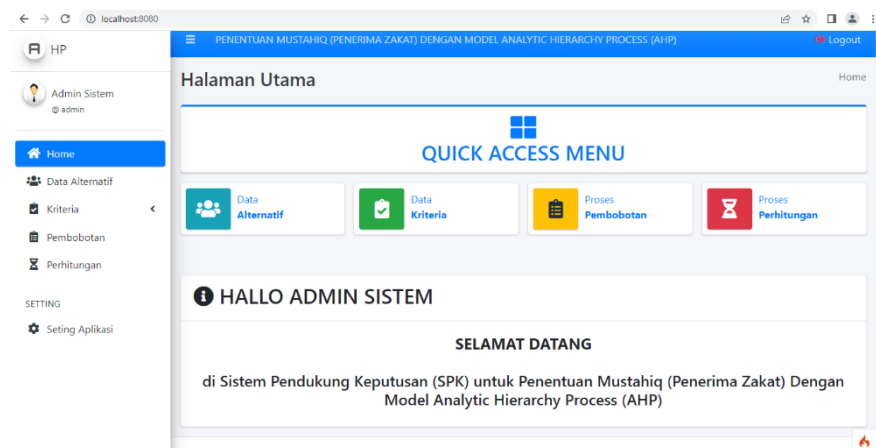
Table 3.20. Results of Analysis or Ranking of Manual Calculations

Berat	profession	The number of dependents	Age	Home ownership	Income	The final result	Rank
	0,4952	0,2418	0,0346	0,0618	0,1662		
Faqir	0.2317	0,3528	0,4783	0.2668	0,342	1.6716	1
Gharim	0,0242	0,3631	0.2708	0.1655	0.2921	1.1157	2
Ibnu Sabil	0,0794	0,0559	0.135	0.1171	0,2379	0,6253	8
Miskin	0,0943	0,1115	0.2438	0,0751	0,2283	0,753	5
Riqab	0.1778	0.2844	0.1505	0.1256	0.2123	0,9506	3
Mualaf	0.1143	0,2555	0,0728	0,0638	0,2232	0.7296	6
Amil	0,143	0.1655	0,2017	0,0809	0.1167	0.7078	7
Fisabilillah	0.1351	0.1887	0,2245	0.1049	0.1248	0,778	4

DISCUSSIONS

In this discussion section, want to explain the results of mathematical calculations by designing an application according to the principles of the AHP model. Apply the theoretical application to problems in determining zakat recipients by creating new applications and having the same results as mathematical calculations.

Based on the results obtained from this study using the application in the AHP model, it was found that the criteria that were very influential in determining zakat recipients (mustahiq) were job criteria that received 49.5% results then as an alternative decision support in determining zakat recipients (mustahiq). generated in the application using the AHP model are the poor. So this application aims to facilitate someone in determining the recipient of zakat (mustahiq).



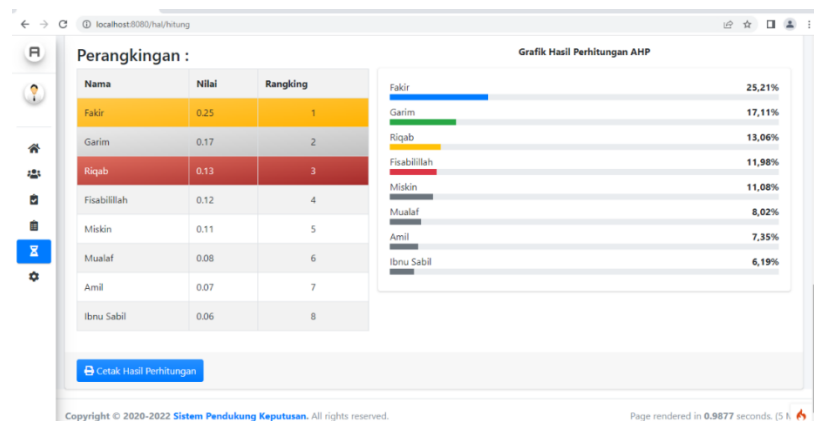
Picture 4.1 Main Page of AHP Application

Figure 4.1 is the initial view of the application created. In this initial view, there are several alternative data menus, criteria data, weighting processes and calculation processes. The weighting in this application applies the AHP model.

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Picture 4.2 The Calculation of Priority Criteria and Alternative Weighting Pages

In Figure 4.2 this is a display of all the weighting results with the AHP model in this application. Where the results carried out by the AHP method have been applied to this application so that the same results are obtained in this application as well. Where the order of the highest weighting or classification that gets the first order is: *Faqir*, *Garim.*, *Riqab*, *Fisabilillah*, *Miskin*, *Convert*, *Amil* and *Ibn Sabil*

CONCLUSION

The Based on the results obtained from this study are this study produces a decision support system in determining mustahiq (zakat recipients) using the Analytical Hierarchy Process (AHP) model, where this model has five criteria, namely: age, occupation, income (income) number of dependents, home ownership. Based on the calculation results obtained from the analysis of the application application in the Analytical Hierarchy Process (AHP) model that the main factors that influence the determination of mustahiq include the work factor obtained with a result of 49.5%. Then the second factor that influences is the number of dependents of the family which results are 24.1%. The third factor that influences the determination of mustahiq is the income factor (income) which results in 16.6%. Then the fourth factor is the factor of home ownership which results in 6.1% and the last factor that affects the determination of mustahiq is the age factor which results in 3.4%. The results are obtained based on the Analytical Hierarchy Process (AHP) model with the application that the priority of determining mustahiq (zakat recipients) is the poor at the first level. Then the second priority is gharim, the third priority is riqab, while the fourth priority is fisabilillah, the fifth priority is poor, the sixth priority is mualaf and the seventh priority is amil while the last priority is ibn sabil.

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